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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte OSAMU KOSHIBA and SATORU YAMAUCHI

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Appeal 2007-3042
Application 09/842,955
Technology Center 2600

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Decided: February 1, 2008

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Before KENNETH W. HAIRSTON, ROBERT NAPPI and KARL EASTHOM,
Administrative Patent Judges.

HAIRSTON, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134 of the Examiner's twice rejected claims 1-2. We have jurisdiction under 35 U.S.C. § 6(b).

SUMMARY OF DECISION

We affirm.

INVENTION

Appellants' claimed invention is directed to preprocessing for a video sequence prior to motion compensation encoding with filtering in response to the temporal and spatial neighborhoods of a pixel, and motion compensation of the pixel's macroblock (Spec. 3:2-5).

Claim 1 reproduced below, is representative of the subject matter on appeal.

1. A method of preprocessing for motion-compensated video encoding, comprising:
(a) providing a frame in a video sequence for motion-compensated encoding;
(b) for a pixel in said frame, comparing a difference between (i) the value of said pixel and (ii) the predicted value of said pixel from motion compensation prediction of said frame to a first level;
(c) when said comparing of step (b) indicates said difference is greater than said first level, apply lowpass filtering to said pixel; and
(d) repeating steps (b)-(c) for other pixels of said frame;
(e) motion-compensated encoding of said frame after said filtering.

THE REJECTION

The Examiner relies upon the following as evidence of unpatentability:

| Ueno | US 5,990,962 | Nov. 23, 1999 |
| | | (filed Apr. 08, 1998) |

Zhang   US 6,037,986   Mar. 14, 2000

The following rejection is before us for review.

Claims 1-2 stand rejected under stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ueno in view of Zhang.

OBVIOUSNESS

Claims 1-2 were argued as a group with claim 1 as representative (Br. 3-5).

There is a single issue before us. The issue is whether the Examiner erred in rejecting claim 1 under 35 U.S.C. § 103(a) as unpatentable over Ueno in view of Zhang. The issue turns on whether the argued distinctions over the prior art, i.e., determining a "prediction error" for the entire block and comparing the block prediction error for each individual pixel in the block, constitute claimed limitations. Although the argued distinctions are not commensurate in scope with the claim limitations,[1] we address the applied references with respect to the rejection of record.

FINDINGS OF FACT

The relevant facts include the following:

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[1] Only arguments made by Appellants have been considered in this decision. Arguments, which Appellants could have made but chose not to make in the Brief, have not been considered and are deemed waived. See 37 C.F.R. § 41.37(c)(1)(vii) (2004). In the Brief, the only arguments presented were with respect to claim limitations (b) and (c) of claim 1.

1. The determination of a motion vector as it relates to the prediction error of the entire block, the comparison of the block prediction error for each individual pixel in the block to a threshold and filtering of that pixel if it has a block prediction error greater than the threshold, are not limitations recited in the rejected claim 1 (claim 1).

2. Ueno teaches motion compensation prediction error and comparing the calculated result with a predetermined threshold value at the block level (col. 7, ll. 13-17).

3. Ueno further teaches low-pass filter processing if there is a mismatch (col. 6, ll. 20-25).

4. Appellants disclose a first tier low-pass filter processing of a pixel within a group/block of pixels (Spec. 5:1-20), and a second tier spatial low-pass filter processing on a per-pixel basis in the x or y direction (Spec. 5:21-6:20).

5. Zhang teaches generating a motion detection metric for a pixel by summing the values of first and second bitmaps for a neighboring group of pixels, which includes the pixel, and comparing the result to a predetermined threshold (col. 3, ll. 21-42).

6. Zhang teaches that the group of pixels may include five pixels on each of the two lines above the given pixel and five pixels on each of the two lines below a given pixel (col. 3, ll. 42-47).

7. Zhang teaches that the motion detection metric may be used to determine whether low-pass filtering should be applied to the pixel (col. 3, ll. 48-60 and col. 9, ll. 31-38).

8. Zhang further teaches that after the low-pass filtering based on a group of pixels takes place at the low-pass filter 34 of Figure 3, additional low-pass filter processing can be performed on a "pel-by-pel" ("pixel-by-pixel") basis in a line or a column at the spatial low-pass filter of Figure 3 (col. 3, l. 62-col. 4, l. 23 and col. 11, l. 63-col. 12, l. 21).

9. The "per-pixel" analysis as taught by Zhang preserves a substantial number of edges and contours in the original image while also removing many undesirable high-frequency components (col. 12, ll. 11-21).

10. U.S. Patent No. 6,058,143 in col. 1, l. 22-37, and U.S. Patent No. 6,058,140 in col. 2, l. 59-col. 3, l.12 teach as well known in the art that MPEG-2 compression does require motion vectors (U.S. Patent No. 6,058,143 (filed Feb. 20, 1998) and U.S. Patent No. 6,058,140 (filed Sep. 08, 1995)).

PRINCIPLES OF LAW

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S. Ct. at 1734 ("While the sequence of

these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.")

One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). The test of obviousness is what the combined teachings would have suggested to those of ordinary skill in the art. *Id*. at 425.

The Examiner bears the initial burden of presenting a prima facie case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). If that burden is met, then the burden shifts to the Appellants to overcome the prima facie case with argument and/or evidence. (*See Id*.)

The Examiner's articulated reasoning in the rejection must possess a rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). The Supreme Court citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) stated that "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." However, "the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). We determine the scope of the claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re American Academy of Science Tech Center*, 367

F.3d 1359, 1364 (Fed. Cir. 2004).

Although claims are interpreted in light of the specification, limitations from the specification are not read into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

ANALYSIS

Did the Examiner err in rejecting claims 1-2 under 35 U.S.C.
§ 103(a) as unpatentable over Ueno in view of Zhang?

Claims 1-2 were argued as a group with claim 1 as representative (Br. 3-4). The Examiner determined that Ueno teaches all the steps of claim 1 with the exception that motion compensation and the lowpass filtering decision are carried out at the block level and not at the pixel level as required in steps b-d as claimed (Ans. 3-4). However, the Examiner further determined that the secondary reference of Zhang teaches the low-pass filtering decision at the preprocessor at a "per-pixel" level so that the filtered image preserves edges and contours in the original image while removing many undesirable high-frequency components (Ans. 4). Appellants argue that the determination of the motion vector relating to the "prediction error" of the entire block as claimed in claim 1 is taught by Ueno (Br. 3-4). However, Appellants assert that the comparison of the block prediction error for each individual pixel in the block to a threshold and filtering based on that comparison is as claimed in step (b) of claim 1[2] taught by neither Ueno nor Zhang

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[2] We note that if the limitation (b) of claim 1 addresses the comparison of the block prediction error for each individual pixel in the block as argued by the Appellants (Br. 3), then claim 1 is incomplete under 35 U.S.C. § 112, second paragraph, as the preceding step of the determination of a motion vector relating to the "prediction

nor by their combination (Br. 3-4). Appellants further argue that the secondary reference of Zhang does not teach motion vectors or motion compensation and teaches a type of preprocessing which can be performed independently of Ueno and thus, there is no suggestion to combine (Br. 3).

The features upon which Appellants rely; i.e., the determination of a motion vector as it relates to the prediction error of the entire block, the comparison of the block prediction error for each individual pixel in the block to a threshold, and filtering of that pixel if it has a block prediction error greater than the threshold, are not recited in the rejected claim 1 (Finding of Fact 1). Although claims are interpreted in light of the specification, limitations from the specification are not read into the claims. *In re Van Geuns*, 988 F.2d at 1184. Thus, the arguments with respect to the motion vector as it relates to the prediction error of the entire block, the comparison of the block prediction error for each individual pixel in the block to a threshold and filtering of that pixel if it has a block prediction error greater than the threshold, as presented in the Brief (Br. 3), are not commensurate in scope with the limitations of claim 1.[3] Therefore, the Examiner did not err in rejecting claims 1-2 under 35 U.S.C. § 103(a).

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error" of the entire block is not claimed. Furthermore, the claim would lack written description under 35 U.S.C. § 112, first paragraph, as the specification does not support the comparison of the block prediction error for each individual pixel in the block without the determination of the motion vector relating to the "prediction error" of the entire block. These errors should be corrected if the present application is further prosecuted.

[3] We note that the allowed claims include the argued or equivalent limitations.

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However, we still address the references and their combination for completeness and relevance in the rejection of record. Ueno teaches motion compensation prediction error and comparing the calculated result with a predetermined threshold value at the block level (Finding of Fact 2). Ueno further teaches low-pass filter processing if there is a mismatch (Finding of Fact 3). Appellants do not dispute these facts (Br. 3). Appellants, however, assert that Ueno does not teach the additional preprocessing step of comparing each block prediction error for each individual pixel in the block to a threshold (Br. 3).

As stated *supra*, we determine the scope of the claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re American Academy of Science Tech Center*, 367 F.3d at 1364.

Appellants disclose a first tier low-pass filter processing of a pixel within a group/block of pixels and a second tier spatial low-pass filter processing on a per-pixel basis in the x or y direction (Finding of Fact 4).

Zhang teaches generating a motion detection metric for a pixel by summing the values of first and second bitmaps for a neighboring group of pixels, which includes the pixel, and comparing the result to a predetermined threshold (Finding of Fact 5). The group of pixels may include five pixels on each of the two lines above the given pixel and five pixels on each of the two lines below a given pixel (Finding of Fact 6). The motion detection metric may be used to determine whether low-pass filtering should be applied to the pixel (Finding of Fact 7). Thus, Zhang teaches low-pass filtering of a pixel which is part of a group of pixels after

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comparing the summation of the bitmaps of the group of pixels to a predetermined threshold for motion correction. Zhang further teaches that after this low-pass filtering based on a group of pixels takes place at the low-pass filter 34 of Figure 3, additional low-pass filter processing can be performed on a "pixel-by-pixel" basis in a line or a column at the spatial low-pass filter of Figure 3 (Finding of Fact 8).

Thus, Zhang teaches a two tier preprocessing similar to the current invention with a first tier low-pass filter processing of a pixel within a group of pixels, and a second tier low-pass filter processing on a "pixel-by-pixel" basis in a line or a column at the spatial low-pass filter (Findings of Fact 5-8).

The Examiner articulated as a motivation to combine that the "per-pixel" analysis as taught by Zhang preserves a substantial number of edges and contours in the original image while also removing many undesirable high-frequency components (Finding of Fact 9).

Thus, based upon the Examiner's reasoning, we find that it would have been obvious to one skilled in the art at the time that the invention was made to have modified Ueno, which discloses the first tier filter processing of pixels based on a group of pixels and more specifically a block of pixels, with the additional second tier spatial filter processing as taught by Zhang for the articulated rationale of preserving a substantial number of edges and contours in the original image while also removing many undesirable high-frequency components.

With respect to the Appellants' argument regarding the lack of motion vectors in the Zhang reference, we adopt the Examiner's explanation that it would have been obvious to one skilled in the art that when MPEG-2 compression is used

as shown in Figure 3, element 24 of Zhang, that it would have necessitated the determination of motion vectors (Ans. 5). See also Finding of Fact 10.

Finally, we are not persuaded by Appellants' argument that Zhang is a type of preprocessing which can be performed independently of Ueno and thus, there is no suggestion to combine (Br. 3). All patented inventions are presumed to perform independently under the 35 U.S.C. § 112, first paragraph, enabling requirement. Furthermore, one cannot show nonobviousness by attacking references individually where the rejection is based on a combination of references. *In re Keller*, 642 F.2d at 425. The test of obviousness is what the combined teachings would have suggested to those of ordinary skill in the art. *Id.* at 425. As we found *supra* the combined teachings of Ueno and Zhang would have suggested to those skilled in the art to add a second tier of pixel processing for the articulated rationale of preserving a substantial number of edges and contours in the original image while also removing many undesirable high-frequency components (Finding of Fact 9).

For the foregoing reasons we find that the Examiner did not err in rejecting claims 1-2 under 35 U.S.C. § 103(a) as unpatentable over Ueno in view of Zhang.

CONCLUSIONS OF LAW

We conclude that the Appellants have not shown that the Examiner erred in rejecting claims 1-2 under 35 U.S.C. § 103(a).

DECISION

The decision of the Examiner to reject claims 1-2 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

<u>AFFIRMED</u>

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